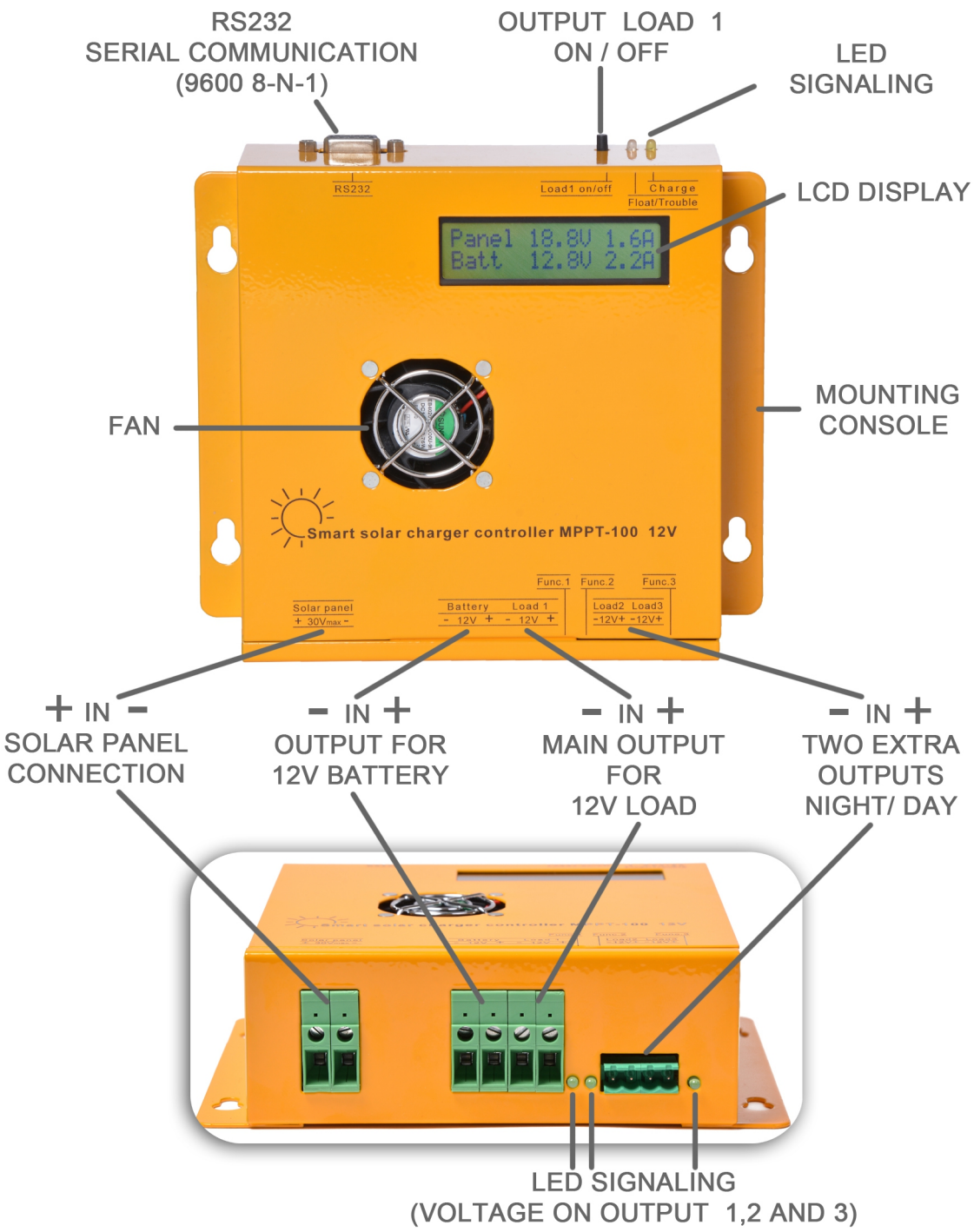
INSTRUCTIONS FOR USE

Smart solar charger controller MPPT-100
10..30V 12A

CHARACTERISTICS

- **Fast algorithm for search maximum power point (300ms)**
- **Stable and reliable MPPT search**
- **4 battery charging phase: bulk charge, absorption, equalization, float charge**
- **Display values on the LCD screen**
- **Prolong the battery life**
- **High efficiency operation: 95%**
- **PV panel input voltage 10...30V**
- **Recommended power consumption FP: 60...250W**
- **Temperature protection - switch off at: 90°C**
- **Serial output for sending data RS232**
- **Main output with a switch ON/OFF**
- **2 extra day/night outputs**
- **Electronic protection against incorrect battery connection**
- **Mounting console**

SMART SOLAR CHARGER CONTROLER MPPT-100 OVERVIEW



BASICS

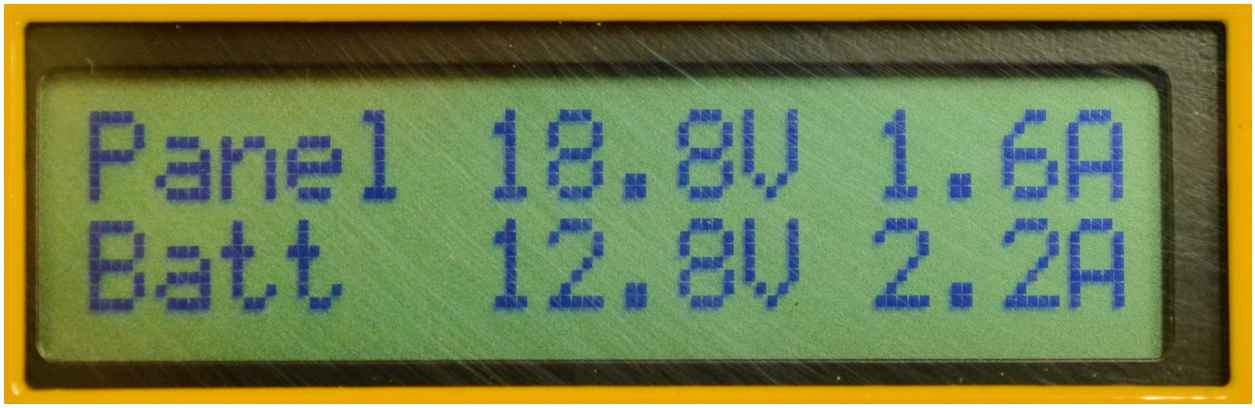
Sun regulator is intended as connective part between 12V lead battery and photovoltaic (PV) panel. It empowers control under charging of battery from photovoltaics PV panel and at the same time also impedanice assimilation between PP and battery or said in other way, it seeks for point between voltage and current, where output of energy from PP is maximal in present moment (Maximum Point Power Tracking or MPPT). In the device is programic built in principe of modificated perturbation mode of seeking of maximal power. In practice, we have found out, that we can get cca 30% higher power from PV panel, if MPPT device is connected as interlink. In addition MPPT device acts, that in long sunny intervals and small consumption of currency, do comes to the unwished effects of overcharging of battery and with that to its destruction.

CONNECTIONS

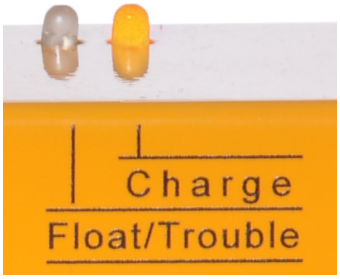
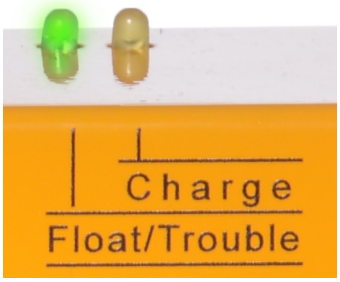
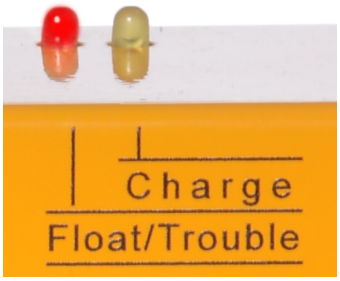
PANEL	cable max 6mm^2
BATT	cable max 6mm^2
Load 1	cable max 6mm^2
Load 2	MS1, cable max 2,5mm^2 (max 6A)
Load 3	MS2, cable max 2,5mm^2 (max 6A)
DB9	sig. cable RS2323 ser. kom.

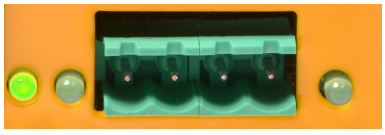
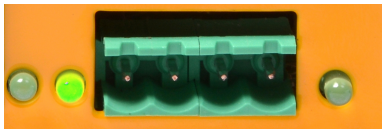
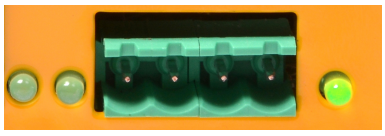
STATUS ON LCD DISPLAY DURING OPERATION

The values of voltage and current of photovoltaic panel and battery are displayed on the screen during operation of the MPPT-1000 solar controller.



LEGEND OF LED SIGNALS

LED	description:
	orange LED is on »CHARGE«
	battery is charging
	green LED is on »FLOAT«
	battery is full
	red LED is on »TROUBLE«
	too high temperature or the battery is not connected

	Func.1- green LED is on
	on the main output »Load1« is a load
	Func.2- green LED is on
	night out »Load2« is active
	Func.3- green LED is on
	daily output »Load3« is active

STATUS ON LCD DISPLAY

MPPT-100	introductory greeting
No battery	the battery is not connected or it is incorrectly connected
Panel 21.5V 3.4A BATT 13.2V 5.4A	the PV panel and the battery are properly connected to the MPPT-100, the battery is charging
Panel volt error	too high voltage on PV panel (higher than 33V)
Battery full	the battery is fully charged
No panel voltage	there is no solar power or the PV panel is disconnected
Low battery	the battery voltage is too low all outputs are switched off
Temp. err	the device turned off due to high temperature

DESCRIPTION OF OPERATION

Immediately when sun come to the sky, device MPPT automatic switch on. On the screen will be:

1.) **"MPPT 100"**

If battery is not connect to device MPPT-100, red LED will be switch on and on screen will be inscription:

2.) **"No battery"**

If battery is connect to the device MPPT-100, yellow LED will be switch on »CHARGE«, battery begin charging. Output **Load3** will be active and green LED **Func.3** will switch on too. Output **Load2** will not be active. On display will be actually voltage and current of PV panel and battery.

3.) **"Panel 21.5V 3,4A"**
"Batt 13,2V 5,4A"

If voltage on the PV panel higher than 32V system will blocking red LED will switch on and on screen will be inscription:

4.) **"Panel volt error"**

System have 4 stage of charging: bulk 12A, absorbtion 14.0V, equalization 14.4V, float 13.5V. If device is on status bulk charger or absorbtion or equalization will yellow LED switch on, if device is on status float will green LED switch on. If battery is totally charged, device will work in discontineus mode and on screen will inscription:

5.) **"Battery full"**

If system is on mode »FLOAT« and to begin very high load and battery voltage drop below 12.5V, device go automatic to mode bulk charge an yellow LED will switch on.
The system re-enters the bulk charge state after the battery voltage drops below 12.5V or during daylight.
If sun go down and voltage drop on PV panel below 8V, device go to hibernate, LED switch off. Output **Load2** (night output) will be automatic active and output **Load3** (day output) will be inactive, on screen will be inscription:

6.) **"No panel voltage"**
"Batt 13,2V 0,0A"

The night output **Load2** turns on automatically and the green LED under **Func.2** lights up.

All the time system controls voltage on the battery, if it is drop below 10.8V, will after time delay 7 sek. switch off all active output **Load1** and output **Load3**, if is daily time, or outputs **Load2**, at night (there is a delay of about 30 seconds and a red LED lights up.)

With push-botton Load1 **on/off** can every time switch on/off **Load1** and thus disconnect the load, which is connected to the device MPPT-100, to a terminal called **Load1**, its operation is accompanied by a green LED next to the terminal called **Func.1**. **Load2** and **Load3** automatic switch on/off dependence of day/night. Also, the load outputs of **Load2** (night output) and **Load3** (day output), which work alternately day/night, are monitored by two LEDs next to the terminal blocks, under the called **Func.2** and **Func.3**.
In the presence of voltage on the FP, the inscription under no. 3., the system starts charging the battery and the electronic switches turn on when the battery voltage rises to 12.5V. **Load3** output turns on automatically and **Load2** switches off. The **Load1** output automatically turns on if it was active before shutting down due to over-discharged battery.

If the battery voltage is too low all outputs are switched off.

7.) **"Low battery**

If device overheat, will automatic switch off and on the display will be inscription:

8.) **"Temp. err"**

SERIAL COMMUNICATION RS232

The device sends information on the PV panel (Up) voltage and the PV panel (Ip) current, the battery voltage (Ub), and the battery current (Ib) to the DB9 terminal during operation. The data can be viewed with a Hyper terminal that works in Windows. The data output is as follows:

Up=17.5V, Ip=2.5A
Ub=13.2V, Ib=3.2A

Setting of hyper terminal: baud=9600; parity=N; bits=8 (9600 8-N-1)

TEHNICAL DATA

input voltage (photo panel voltage)	10..30V
modulation operation:	9V < Ufp < 33V
current consuption if no sun	30mA
max battery output current	12A (limitation in device)
4 stage battery chargingi system	bulk charge 12A/, absorbtion 14.0V/ equalization -14.4V / float 13.5V
max output power	150W
battery type	12V 24Ah min, acid
manual switch on/off	LOAD1
Load 1 max current	15A (fuse)
Load 2 automatic, night active	max 3A
Load 3 automatic, day active	max 3A
fuse 15A output BATT	inside device
deep battery discharging	off at 10,8V/ on at 12,5V (7sek/30sek time delay)
review of value	LCD display 2x16 character
efficiency	95,00%
temperature protection	off 90°C/ on 80°C
recommended photo panel	80...250W, 36 cels (21,6V)
weight	700g
dimension	w: 135mm h: 55mm l: 150mm
principe of MPPT	modified perturbation and observe (MP&O)
protect	IP20
active cooling	fan on 50°C/off 40°C
use area	boats, sailboats, campers & caravans, el. pastures, el. watering, smaller holiday cottages...
version	wall mounting

WARNING!

- **Solar charger controller MPPT-100 is designed for indoor use (do not expose it to rain).**
- **Never put the panel input in short-circuit if battery is connected to the device.**
- **Connect only 12V lead-acid batteries correct to Battery output!**
- **Maximum voltage on PV panel output is 30V!**

SERVICE AND GUARANTEE

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Slovenia

Tel.++386 (0)1 7869-037 Fax++386 (0)1 7869-038
e-mail: info@eyra-elektronika.si http://www.eyra-elektronika.si

GUARANTEE STATEMENT

Guarantee conditions:

1. **The guarantee is valid for 24 months from the date of sale.**
2. **The guarantee repairs are carried out exclusively by an authorized service center.**
3. **The guarantee applies only to the charger, and not to any other device connected to this module.**
4. **The guarantee and liability does not include any fees, postal costs, damages and any costs related to the failure of this device.**
5. **The guarantee does not apply to batteries, mechanical damage or lightning strikes.**
6. **The guarantee does not apply if the device was mounted or used in violation of the instructions.**
7. **The guarantee does not apply if an unauthorized person interferes with the device.**
8. **If, during the guarantee period the device is not repaired within 45 days from the date of receipt in our service center, we are obliged to replace it with a new one.**
9. **The guarantee period shall be extended for the period of repair.**
10. **The original invoice must be submitted for the enforcement of the guarantee.**

seller :

company:

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name and surname of the seller:

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signature of the seller:

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date of sale:

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stamp: